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THE ROLE OF ACTIVITY IN ANTICIPATING AND CONFRONTING STRESSFUL STUATIONS

REUVEN GAL, Ph.D., and RICHARD S. LAZARUS, Ph.D.

This paper is an analytical review of studies comparing stress reactions in threatening situations during which the person can or cannot take action. The studies reviewed were conducted mainly in real-life situations and involved diverse forms of coping activities under various conditions of danger and distress. To achieve a better understanding of the effect of activity on stress reactions, several distinctions are made: between various types of stress reactions; between various indices and measurements of stress reactions; between activity which is directly related to the source of threat and activity which is not; and between various personality dimensions. The adaptive potential of activity in stressful situations is discussed in terms of: the sense of mastery and control provided by activity; activity as a means of attention diversion; and activity as a means of discharging energy generated by mobilization. It is suggested that taking action under stressful conditions, as opposed to remaining passive, is a powerful coping tool.

Reactions to stress traditionally have been studied by making situational stress conditions the antecedents or independent variables. While most studies have focused on the effects of noxious stimuli on the individual's responses —for example, "behavior under stress," "somatic effects of stress," "performance under stress," etc, very little effort has been devoted to the influence of the individual's behavior itself — his/her activity — on the stress reactions. Only recently has it been clearly recognized that behavior under stress is not just a one-step, unidirectional process; rather, continuous self-regulation always is taking place.[1] The present paper is an attempt to elaborate this point and to illustrate its dynamics in various stressful situations. Our main thesis is that being engaged in activity — rather than remaining passive — is preferable for most individuals in most stressful situations and can be highly effective in reducing threat and distress. This thesis seems viable despite the seemingly contradicting results that have been obtained in several studies. We shall discuss the reasons for these contradictions, as well as some possible explanations of them.

First, a clear and plausible definition of "activity" in this context is required. By "activity" we mean overt, motoric action taken by the individual while he is

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anticipating or confronting a threatening event. "Passivity," on the other hand, is the absence (or unavailability) of such motoric activity during anticipation or confrontation. However, since it is very difficult to imagine a prolonged period of total passivity (even hand-clenching movements and eye movements *are* overt motoric actions), and since, conversely, activity is not a simple entity, it seems more reasonable to speak of "activity" and "passivity" as extremes on a continuum. In this light, there are many types of behavior that can be called "active." Although it would be senseless to attempt to list all such possibilities or even to categorize them, one distinction is basic to this discussion. This concerns the difference between "threat-related" and "non-threat-related" activity. The former refers to activity that might affect either the occurrence or nature of the impending threatening event. "Non-threat-related" activity, on the other hand, has no such effect on the threatening event.

The advantages of being engaged in activity, such as exhausting muscular activity or a demanding task, while being threatened by an impending harmful event, are not immediately obvious. That the activity is directly "threat-related" does not make it less demanding. In fact, such activity may be viewed initially as a further source of stress. Several studies employing the paradigm used in Brady's "executive monkey" study[2] have suggested that it is the passive participant in the threatening situation who remains relatively unstressed, while the active, "executive" partner exhibits severe stress reactions. The implicit conclusion derived from these studies has been that being active and having control over a stressful situation is more stressful and hence more undesirable than passivity and lack of control. It is our intent to refute this conclusion and to argue that it is oversimple and misleading. While the importance of various kinds of *control* in mitigating stress was discussed recently in a very able and detailed way,[3] the present paper will concentrate mainly on the coping value of *activity* in stressful situations.

EMPIRICAL EXAMPLES

In this section we will review several studies in which active and passive modes of behavior were compared in highly stressful situations. This review will concentrate on studies that have used real-life stressful situations. Some such studies have been conducted with military subjects during combat situations or highly stressful training episodes. Included also will be studies dealing with hospitalized patients or families with a sick or dying member. Not only are such studies most relevant to the present issue, but they also derive their data from intense and threatening conditions that cannot be found in the laboratory.

When "passivity" and "activity" are considered, a prime example is the research by Brady, et al, using an "executive" and a "yoked," control monkey.[4] The "executive," active monkeys showed severe stress reactions to the anticipated shocks, ending with fatal ulcers, while none of their "passive," control partners exhibited such reactions. However, later studies by Brady and others have obtained results contradicting the original ones.[5-7]

Following the executive-monkey paradigm, a group of Navy psychologists studied in detail the reactions of pilots and their flight officers during aircraft carrier landing practice with the two-man Phantom (F-4B) jet.[8-10] Although in this situation both men are exposed to the same dangers, the pilot is active and has complete control of the aircraft, while his partner, the radar intercept officer (RIO), is completely inactive and has no control over the flight of the aircraft. Both physiological and psychological measurements were obtained from these pairs of subjects, during day, night, and simulated landing flights.

". . . the pattern of differences between the two groups that was shown in the physiological measures had no parallel in the psychological measures."

Comparisons between the hormonal stress responses of the two groups revealed stronger steroid reactions for the pilots than for the RIOs. The pilots showed higher serum cortisol levels[9] and higher 17-OHCS levels[8] than the RIOs. However, changes in MHPG (3-methoxy-4-hydroxyphenylglycol), which is the urinary catecholamine metabolite that best reflects noradrenaline turnover, were similar for the pilots and the RIOs and did not show differential stress reactions, which the corticosteroid responses did.[10]

In contrast to the physiological finding of higher corticosteroid levels in the urine of the pilots compared with the RIOs, the psychological stress reactions of these groups were in the opposite direction: during the flight periods, the RIOs reported both a greater number of somatic complaints and a higher level of anxiety than did the pilots.* This trend in psychological reactions takes on special significance in the light of the opposite pattern in the physiological reactions.

In contrast with these findings on naval aviators, Bourne, et al, did not find great differences between the levels of 17-OHCS secreted by seven helicopter ambulance medics during on-duty as opposed to off-duty periods in the course of three weeks of flying combat missions.[11] That is, subjects in this study did not differ in their corticosteroid reactions on flying versus nonflying days. Moreover, their chronic mean level of steroid secretion throughout the entire period of study was considerably lower than had been expected from predictions based on body weight. The anxiety levels of six of the helicopter medics were measured also, by means of an adjective check list.[12] While their mean anxiety level on mission days was slightly higher than on non-mission days, it was still lower than the level found among recruits during basic training in the U.S.[13] The authors attempt to explain these unexpected findings by suggesting that the medics had used "very extensive and effective psychological defenses." For example, it was evident from the introspective reports of the medics that rather than thinking about the threat of death or mutilation, they directed their attention to details of their missions — either technical aspects of the flight missions themselves, or the importance of their job in saving other soldiers' lives. This kind of cognitive activity occurred during both on-duty and off-duty days.

In a different combat situation, the physiological reactions of a group of soldiers in a special combat unit in Vietnam, who were anticipating an enemy attack, were investigated.[14] Measurements of their levels of 17-OHCS

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*It should be noted that the RIOs' *baseline* anxiety level, as measured by Taylor's MAS, was also slightly — though not significantly — higher than that of the pilots.

did not indicate any profound emotional arousal. Furthermore, the soldiers' levels of anxiety and depression (as shown in their successive responses on an adjective check list) here again were markedly lower than the levels shown by basic trainees.[15] The authors explained these findings of low stress levels by referring to the fact that the soldiers' typical mode of coping with the impending threat was "to engage in a furor of activity which rapidly dissipated the developing tension." This activity was mainly of a routine, motoric nature, such as building defenses and maintaining equipment. The only men in the group who showed elevated levels of 17-OHCS were the two officers and the radio operator — a finding which is interesting in that it suggests that factors other than activity, such as responsibility (implying psychological stress), may account for elevations in 17-OHCS levels in such situations.

". . . an alternative approach to the study of the role of activity in threatening situations is to observe the *spontaneous* behavior of individuals who are under stress."

Davis has reported some studies conducted with American infantrymen participating in the Korean War.[16] In one, two groups of soldiers were compared with regard to their physiological and psychological reactions immediately after being involved in battle activities. One group — the "attacking company" — consisted of 20 men who had participated in a very intense attack. The battle lasted 18 hours, and the company suffered 61 percent casualties. The other group — the "defending company" —did not engage in an offensive attack but was stationed on the fighting line for five days, was continuously bombarded by artillery, and suffered 17 percent casualties. Although these groups differed in the intensity and duration of their combat experiences, a major difference between them could be said to lie in the *nature* of their combat *activities:* While the "attacking company" was engaged in an offensive attack, initiated by them and generally under their own control, the "defending company" played a predominantly passive role, waiting for enemy attack and sheltering themselves from the heavy artillery.

The differences in the physiological reactions of these two groups were quite impressive. The men in the attacking group showed a marked rise in their corticosteroid (17-ketosteroids) level, their balance of salts changed (resulting in a smaller ratio of sodium to potassium), and their white blood-cell count dropped. None of these changes occurred among soldiers in the defending company. Rather, immediate post-combat tests indicated that their adrenal activity was *below* normal, and most of their other physiological reactions remained normal. Thus the measurements immediately after combat revealed that only the more active group showed profound physiological reactions to the combat situation. On the other hand, when results from psychological tests were compared, no differences were found between the two groups. Rather, soldiers in *both* groups were impassive and withdrawn. Thus, the pattern of differences between the two groups that was shown in the physiological measures had no parallel in the psychological measures.

However, the whole picture changes when the same physiological reactions of the attacking and defending companies are compared with regard to the length of recovery time. It took the men in the attacking company about six days to recover physiologically from their intense stress (in terms of hormone levels, salt balance, and white blood-cell count), while the men in the defending company required an average of 13 days to regain their physiological baselines. Thus, solely from the point of view of length of recovery time, the more "passive" soldiers exhibited stronger stress effects than the "active" soldiers — a finding opposite to what was revealed immediately after combat.

"... individuals can actively turn the situational *demands* of tasks into effective situational *resources* to aid in coping successfully with their distress."

The examples discussed above concerned comparisons of physiological and psychological variables of individuals and groups *assigned* active or passive roles. None of these studies paid attention to the roles that would have been *preferred* by individuals in such situations. In the case of the naval aviators, for example, the investigators could have asked the active pilots (who showed higher adrenocortical reactions than their passive partners) whether they would have "changed seats" with their passive RIO partners. An educated guess is that they would not have preferred the passive role.

In this connection, an alternative approach to the study of the role of activity in threatening situations is to observe the *spontaneous* behavior of individuals who are under stress. One example of this sort involves a source of stress very different from those cited above. In a study of Israeli Navy sailors, several variables were explored that might affect the degree to which subjects suffered from seasickness.[17] Severity of the physiological seasickness symptoms was distinguished from the individual's level of performance. For example, two sailors could exhibit the same type and degree of physical symptoms while demonstrating quite different levels of activity and performance capability. It was found that many individuals got considerable relief from their symptoms by "forcing" themselves to engage actively in their normal, assigned tasks. This is quite surprising if one remembers that seasickness usually creates feelings of apathy, fatigue, and depression. Furthermore, the more sophisticated and attention-demanding a sailor's assigned tasks were, the more effectively he tended to utilize these tasks as adaptive resources in coping actively with his sickness. Thus, as in the earlier illustrations, individuals can actively turn the situational *demands* of tasks into effective situational *resources* to aid in coping successfully with their distress.

FURTHER DISTINCTIONS

All of the studies reviewed so far concerned comparisons between the reactions of active and passive participants in several types of stressful situations. "Activity" and "passivity" were distinguished from each other and defined as two extremes on a continuum. However, as can be concluded from the discussion thus far, comparisons made solely on the basis of the active-passive dimension do not reveal clear-cut or consistent results. Further distinctions — both with regard to activity and passivity, and with regard to the various response measurements used — must be made. In developing these distinctions, we will refer to the studies reviewed earlier and add supportive data from other research as well.

Physiological versus Psychological Stress Reactions

In most of the studies reviewed so far, greater physiological reactivity was found on the part of the active, "executive" partner in each of the subject pairs.[2,8,9,16] At the same time, whenever psychological measures — such as reported anxiety level — were also made, they either contradicted or at least failed to parallel the physiological indicators. Detailed examination of the relationship between physiological and psychological variables is beyond the scope of this paper. However, it should be noted that again and again it has been shown that psychological fear and physiological arousal are quite independent concepts.[18-22] In most, if not all, of the foregoing examples, the elevated physiological reactions exhibited by the active subjects can be interpreted as reflecting merely the body arousal that accompanies any overt activity. Moreover, often no direct relationship is found between levels of adrenocortical excretion and psychological measures of anxiety, such as clinical interviews and Rorschach tests.[23] Thus, it is reasonable to argue that the hormonal elevations found among the pilots and infantrymen in the studies cited earlier do not necessarily reflect level of anxiety or distress. Although active roles in stress situations do appear to enhance physiological arousal, these roles seem to be preferred by the participants and to be less anxiety-inducing than passive roles in the same situations. In a sense, then, active behavior sometimes seems to reduce psychological stress while increasing physiological arousal. A similar conclusion was drawn by Shanan, et al;[24] after investigating the coping behavior of American adolescent girls who had come to Israel to study for a year they concluded: " . . . Cortical steroid excretion and especially 17-OH excretion is connected with an active involvement to *cope with stress* rather than with anxiety itself [p. 465; italics added]."

While investigators so far have failed to show a direct parallel between various autonomic and hormonal indices, on the one hand, and specific emotional states, on the other, attempts to establish such links continue. Results of some of these attempts may further illuminate the findings we have reported, especially with regard to the active-passive dimension. An example related to the autonomic nervous system is Lacey's "directional fractionation" hypothesis.[25] Lacey has demonstrated that the patterning of autonomic reactions reflects an individual's psychological orientation to or his mode of coping with the particular situation he confronts. Cardiac deceleration and decrease in blood pressure seem to accompany intensive attention to environmental cues, while increases in heart rate and blood pressure accompany withdrawal of attention from extraneous environmental stimuli plus engagement with noxious stimuli. On the other hand, skin conductance and respiratory rate show the expected increase under *either* condition.

Examples from the hormonal field show the same specificity. Elevation of adrenaline level has been found to depend on a number of stimulus conditions, such as high uncertainty or lack of control over the situation;[26] a high degree of novelty or ambiguity in the situation;[27] unavailability of a relevant response;[28] and situations that do not call for muscular activity for coping with the threat.[29] On the other hand, noradrenaline elevation appears to be related to intense alertness, attention, and concentration, such as is required to perform complicated tasks.[10]

Regarding possible links between adrenocortical reactions and emotional states, it seems that in the light of present knowledge, one reliable conclusion that might be drawn is Mason's statement[30] that "elevation of 17-OHCS levels is not related to a highly specific affective state, but rather appears to reflect a relatively undifferentiated state of emotional arousal or involvement, perhaps in anticipation of activity or coping [p. 596]." Singer recently provided a conceptual framework, which she has termed "engagement-involvment," for describing those undifferentiated states.[31] This concept includes such features as alertness, attention, arousal, and activation but refers to more than any one of these. On the other hand, Mason's recent research on hormonal secretion pattern specificity suggests a very close link between corticosteroids and psychological threat states, a link that is absent when such threats, normally confounded with physical assaults such as heat and exercise, are removed in laboratory studies on both animals and humans.

What we have tried to show, then, is first, that psychological and physiological indices do not necessarily parallel one another in reflecting any given emotional state; second, that in the presence of active behavior, physiological reactions probably reflect basically body arousal rather than the psychological state; and third, that many specific autonomic and hormonal reactions are differentially related to specific cognitive-emotional states.

Duration of Physiological Stress Reactions

If anything in the hormonal reactions to stress should be taken as reflecting emotional arousal, it is probably the *duration* of the reactions, rather than simply their *magnitude*. That is, while a short-term rise in corticosteroid level might reflect the arousal resulting from the *body activity* that the person is engaged in at the moment, a prolonged reaction of this kind might better be interpreted as reflecting *emotional* arousal. This was clearly demonstrated in Davis' study, in which the "attacking" and "defending" companies were compared with regard to the long-term effects of participating in a combat situation.[16] Comparisons of intensity of physiological reactions revealed a marked rise in corticosteroid level by the active group and minimal adrenal activity among the passive infantrymen. But the recovery time for the "defending company" was twice as long as that of the "attacking company" (13 days after combat as opposed to six days).

". . . many specific autonomic and hormonal reactions are differentially related to specific cognitive-emotional states."

Miller, et al, reached a similar conclusion in their study of naval aviators.[8] Noticing that the ratio of urine cortisol to urine 17-OHCS had increased for the pilots after the carrier landing but remained at preflight levels for the RIOs, the authors suggested that while this increased ratio in the pilots may reflect a sudden and acute adrenal response, the RIOs' response, though less intense, may have begun before and lasted longer than that of the pilots.

We suggest that when hormonal measures are used to make inferences about emotional states, other parameters besides quantities of secretions should be used: the duration of the hormonal reactions and the length of the "recovery" time are important considerations, as are the overall hormonal balance and the interplay between various hormonal substances.[30]

Activity Related or Unrelated to the Threat

While in some situations "active" roles are assigned or at least accessible, in other cases active responses might be unavailable. Mandler has proposed that there will be differential secretion of adrenaline and noradrenaline in stress situations depending on whether or not relevant activity is available.[28] According to this proposition, adrenaline is secreted predominantly in situations characterized by the absence of relevant behavioral responses, while noradrenaline is produced in situations where relevant behavior is available to the individual for meeting the requirements of the situation. Mandler goes even further, stating that "when an ongoing behavior sequence is interrupted and the organism does have some situationally relevant behavior available, anxiety will not appear, and when such behavior is not available, anxiety will appear [p. 101]."

". . . with regard to coping behavior . . . it seems more reasonable to distinguish between activity that is or is not functionally related to the threatening situation."

Mandler's proposition about response availability* requires further clarification. While it is true that under some conditions, "situationally relevant behavior" might not be available to the individual, it is still possible for the individual to engage in *some* active behavior. Thus, with regard to coping behavior, rather than distinguishing between situations in terms of response availability, it seems more reasonable to distinguish between activity that is or is not functionally related to the threatening situation. Presumably, the former type of activity implies a sense of control over the threatening conditions — which itself has, in many instances, stress-reducing effects.[3,32]

An early study by Champion, using electric shock, provides a clear example.[33] Subjects were told to make hand-clenching movements when they felt the shock. In some cases, such movements were "adaptive," to use Champion's term, in the sense that they enabled the subjects to turn the shock off. In the other cases, the hand movements were unrelated to the shock. A control group had no movement to make at all. Thus, a motoric response was either "available" or not and either "threat related" or not. Subjects in both the "related-" and "unrelated-movement" groups showed weaker autonomic reactions (as measured by skin conductance) than subjects who remained inactive during the shock, though only the effect of the "related" movements was significant. The author concluded that "overt muscular movements serve to reduce disturbance *if they are adaptive* [p. 92; italics added]."

It might be proposed that in order to

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*It should be noted that by "response availability" or "situationally relevant behavior" Mandler refers also to the "preparatory behavior" that occurs when a warning signal appears in an anticipatory period.

be "beneficial" to the individual, any action taken in a stressful situation has to be directly related to relief from distress caused by the situation. Such a proposal has been shown to be relevant, for example, in studies of patients anticipating surgery.[34-37] Careful examination of such studies reveals that patients cope more successfully with their distress when they are provided with information and occupied with activities that are directly related to their physical condition (for example, exercising, special modes of breathing or moving).[36]

A similar conclusion might be derived from some of the studies reviewed earlier. For example, the lack of marked stress reactions observed in the helicopter medics[11] can be interpreted as resulting from their being occupied with "threat-related" activities such as mechanical maintenance and preparing for missions. Similarly, the enlisted men in the special combat unit in Vietnam,[14] who showed no hormonal indication of stress, were intensively occupied with building defenses and preparing their weapons — a clear case in which the activity was threat related.

"... even non-related activity during anticipation might lower stress levels ..."

However, a contradictory conclusion — that even non-related activity during anticipation might lower stress levels — can be derived from other studies. In a study of the families of children dying of leukemia,[38] some of the parents took long walks or occupied themselves with sewing and knitting — activities which, the investigators report (though without supportive data), helped the parents to combat their distress and reduce their anxiety.

In a laboratory setting, fear reactions in Israeli Air Force candidates anticipating an electric shock were investigated.[39] Some subjects were provided with a perceptual screening task which had no effect on the impending shock. Those subjects who were occupied with this task encountered the electric shock in a significantly more relaxed state, as measured by heart rate, than subjects who waited for the shock inactively. Thus, it may be that an activity does not necessarily have to be directly related to the threat in order to be effective — although relevant activities seem to be preferable. Presumably, each type of activity calls into play different psychodynamics.

Personality Differences

Although being able to take action during stressful periods has positive value for some individuals, it might have negative value for others. For example, if we assume that increased sense of control is the major virture of an active response to threat, the dimension of internal versus external locus of control[40,41] should play some role in the effects of activity versus passivity in stressful situations. "Internals" should tend to prefer and to feel more confident in a situation over which they have some control, whereas "externals" should prefer, and probably feel better in, a situation in which any action they take will not affect the consequences. Some evidence supporting this assumption has, in fact, been found.[42]

Examples of other possibly relevant personality dimensions are dominance,[43] leadership,[44] mastery concern,[45] and an active-coping tendency.[46] The latter clearly acted as a moderator variable in the previously mentioned study of seasickness.[17] The active-coping tendency of sailors in that study was assessed using Shanan's Sentence Completion Form.[47] Sailors with high active-coping scores were able to maintain a relatively high level of functioning despite their severe seasickness. But for sailors lacking this active-coping tendency, the requirements of their tasks only aggravated the distress with which they already were struggling.

POSSIBLE EXPLANATIONS OF HOW ACTIVITY AFFECTS STRESS REACTIONS

In the light of the findings we have reported, some possible explanations of how activity affects stress reactions can be offered.

Feelings of Control and Mastery

In recent theory and research, increasing attention has been focused on various aspects of being in control of and dealing effectively with environmental demands.[3] Several research reports have indicated that subjects generally prefer having control over aversive stimuli to not having control or depending on someone else's control[48-50] (although it is as yet unclear as to when and why control is desirable and anxiety reducing under conditions of threat[3,49]). The activity engaged in by the Phantom-jet pilots can be viewed in this light, which explains their lower levels of anxiety compared to the RIOs, who did not have any flight control. This also may apply to the helicopter aviators during their flight missions and to the "attacking company" in Davis' study in Korea.

A similar interpretation makes use of concepts such as feelings of mastery. For example, Pervin has suggested that "activity involving the feeling of participation in the turn of the events, with the hope of mastery, is preferable to and less anxiety-arousing than no activity at all or activity which leaves the person feeling a helpess victim of inevitable events [p. 581]."[49] In other words, even in instances in which activity does not provide *actual* control over the situation, it is the *feeling* of mastery that the person gains from the action he is performing that reduces his anxiety and feeling of helplessness.

This phenomenon also was described by Grinker and Spiegel in their study of air force pilots during World War II.[51] The initial reactions of the pilots when they were exposed to combat dangers were extreme tension and anxiety. However, as soon as they became engaged in the intensive activity of the combat missions, their initial stress reactions were significantly reduced. Grinker and Spiegel concluded that lack of mastery, or helplessness, is the key to the emotional reaction.

While the concepts of actual control and feelings of mastery provide a reasonably satisfactory explanation of the anxiety-reducing effectiveness of activity in situations where that activity is related (or felt to be related) to the source of the threat, they cannot account for the many cases where activity is in no way related to the impending harm yet is still anxiety reducing. How is one to explain *these* cases? There appear to be two related approaches to this question — one based on the concept of defense mechanisms, the other tied to the concept of attention diversion.

Activity as a Defense Mechanism

Several investigators have proposed that activity — especially motor activity — often operates as a defense mechanism in the behavior of "mentally *healthy*" people.[38,52] In their study of parents of children dying of leukemia, for example, Chodoff, et al, argued that activity such as walking, knitting, and sewing undoubtedly served as a defense mechanism in that it helped the parents to forget about their distress and thereby decreased their anxiety.[38] Other authors also have noted that the sense of activity, as opposed to passive acceptance, may be of vital importance for successful coping with crises such as cerebral trauma,[53] polio,[54] and the process of aging.[55] It may be valuable to quote directly from one of these studies (one involving polio victims):[54]

> "Throughout the study, we were time and again impressed by the relief and encouragement patients obtained through activity . . . It seemed to be quite important for patients to have a sense of being able to do something, not simply wait passively for whatever came [p. 439]."

It is apparent, then, that activity is believed by clinical observers to be very effective in reducing anxiety and attenuating distress — hence serving the same function that defense mechanisms usually do. But what are the underlying dynamics?

Chodoff has written of activity as a mild form of a defense mechanism usually called "isolation of affect."[56] In this instance, he was referring to the behavior of people in the German concentration camps. Various types of activites enabled individuals to attenuate otherwise unbearable feelings of anxiety, anger, and helplessness. Chodoff calls attention, in particular, to sublimation activities, such as recording one's own and others' behavior and carrying out semi-scientific observations, that enabled such gifted individuals as Frankl, Cohen, and Bettelheim to cope with the constant harm and threat inherent in concentration camp life.

It is also possible to view activity as a psychotherapeutic tool, as in cases of depressive patients. Such patients generally exhibit a predominantly passive pattern of behavior. Several clinicians have developed therapeutic techniques aimed at increasing the patients' activity level.[57] Such attempts are reported to achieve satisfactory results. Similarly, the hypomanic state often is regarded clinically as a form of coping with the constant danger of depression. Individuals may be observed who maintain this press of activity over much or all of their lives, presumably never allowing themselves to succumb to their depressive impulses. Grieving persons also quite deliberately push themselves into a fury of work and other activities as a possible antidote to their loss-dominated affective and somatic distress.

"Activity, by definition, cannot be regarded as an intrapsychic defense mechanism."

Although it might be true that activity has a *function* similar to defense mechanisms — namely, anxiety reduction — the process involved in it still differs tremendously from the traditional interpretation of a defensive process in being more consciously determined. Activity, by definition, cannot be regarded as an intrapsychic defense mechanism. Rather, it should be conceived of as a behavioral manifestation of the individual's attempts at *attention diversion.*

Activity as Attention Diversion

The stress-reducing effects of activities unrelated to the cause of the stress probably can best be explained by viewing these activities as distracting or diverting the person's attention from the stress cues. There is considerable evidence supporting this.[58] Moreover, studies conducted in the past several years have provided physiological evidence of the importance of central neural processes, especially the reticular system, in regulating peripheral afferent receptors and selective attention.[59] It has been found, for example, that evoked potentials coursing up the optic fibers toward the visual cortex can be reduced or eliminated when the subject's attention is diverted from the visual stimulus.[60,61] It has also been shown that the activity involved in complex jobs may affect the feedback control of sensory input by the reticular system, thereby preventing the intrusion into consciousness of sensations and perceptions induced by a threatening stimulus.[62] Other studies have shown repeatedly that both cortical and peripheral evoked responses of various types are immediately reduced or eliminated when attention is diverted.[63] The changes in emotional reactions following the introduction of a "distractive" activity are probably related to these effects of attention diversion on central processes.

Activity as a Means of Energy Discharge

The functioning of the autonomic nervous system also has been invoked to explain the relationship between activity and stress reactions. According to the traditional Cannon approach,[64] when an organism is threatened with or confronted by a threatening stimulus, an emergency "fight or flight" reaction is immediately elicited. This reaction is typically manifested in general sympathetic nervous system excitation resulting in adrenaline secretion, elevation in blood pressure, muscular activation, and other physiological changes, which we referred to earlier as body arousal. One can assume that this physiological excitation requires discharge or dissipation. In animals other than man, the discharge normally is achieved *via* automatic, usually species-specific patterns of motor behavior that involve either fighting or fleeing. Not only does this activity often save the endangered animal's life, but it also is the standard means by which body excitation can be discharged. While humans exhibit the same sympathetic excitation when facing danger or threat, complex cultural and institutional norms and rules often preclude direct actions of fight and flight. Therefore, a means for releasing the tension accompanying mobilization often is unavailable. Since the arousal must dissipate in some way, even non-relevant activity under stress has stress-reducing capabilities in that it allows for reasonably rapid dissipation of body mobilization or arousal. Hess and Breznitz, whose study was mentioned earlier, refer to this phenomenon as "the physiological feedback of 'feeling better,' 'calming down,' etc. [p. 312]."[39] Similar conclusions have been drawn by other authors, also.[33]

SUMMARY AND CONCLUSIONS

It is a commonsense notion that people usually prefer to keep themselves busy and active while anticipating a threatening event and that by doing so they may reduce their level of anxiety. However, empirical findings concerning this notion have not been clear-cut, nor is there much general agreement on the interpretation of the findings. It seems to us that there are two major reasons for this confusion. First is the lack of a clear distinction between two major types of activity — threat-related and non-threat-related. Second are the frequently occurring discrepancies between physiological changes and subjective reports when individuals' stress reactions are examined. With regard to the first point, we have attempted to improve definitions and make some relevant distinctions between several types of activity that might have divergent coping functions. Regarding the second point, it was noted that physiological responses should not necessarily be taken as indicators of psychological stress (or distress), but as indicators of general arousal or mobilization.

We also have examined several explanations regarding the capacity of activity to lower psychological stress reactions. The influence of threat-related activities might be satisfactorily explained in terms of the feeling of control or mastery. However, non-threat-related activities require a different explanation. Our preference is to view such activities as providing distraction or diversion of attention from threat. Central as well as peripheral neural processes have been shown to be involved in this latter function of activity.

Regardless of interpretation, it seems quite evident that activity during stressful periods plays a significant role in regulating emotional states. We are inclined to interpret activity as being a principal factor in coping with stress. As has been repeatedly argued by Lazarus, a person may alter his/her psychological and physiological stress reactions in a given situation simply by taking action. In turn, this will affect his/her appraisal of the situation, thereby ultimately altering the stress reaction.[1,65]

INDEX TERMS

stress, anticipation, arousal, activity, coping, psychophysiological measures, combat situations.

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